An Evaluation of the DiaSuite Toolset by Professional Developers

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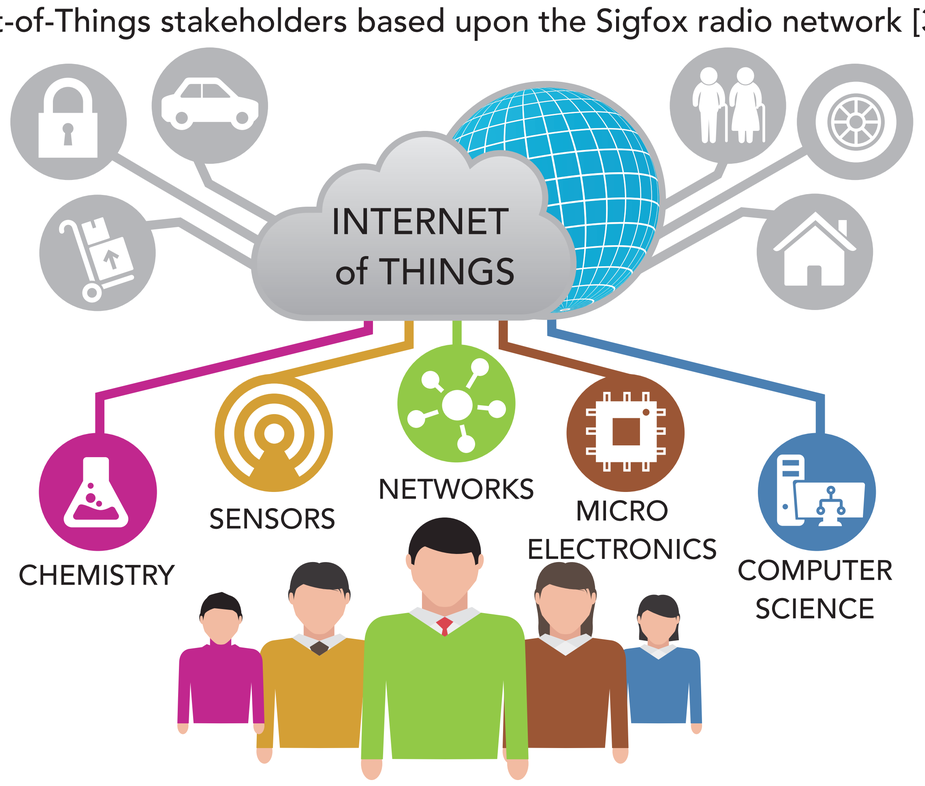
Goal

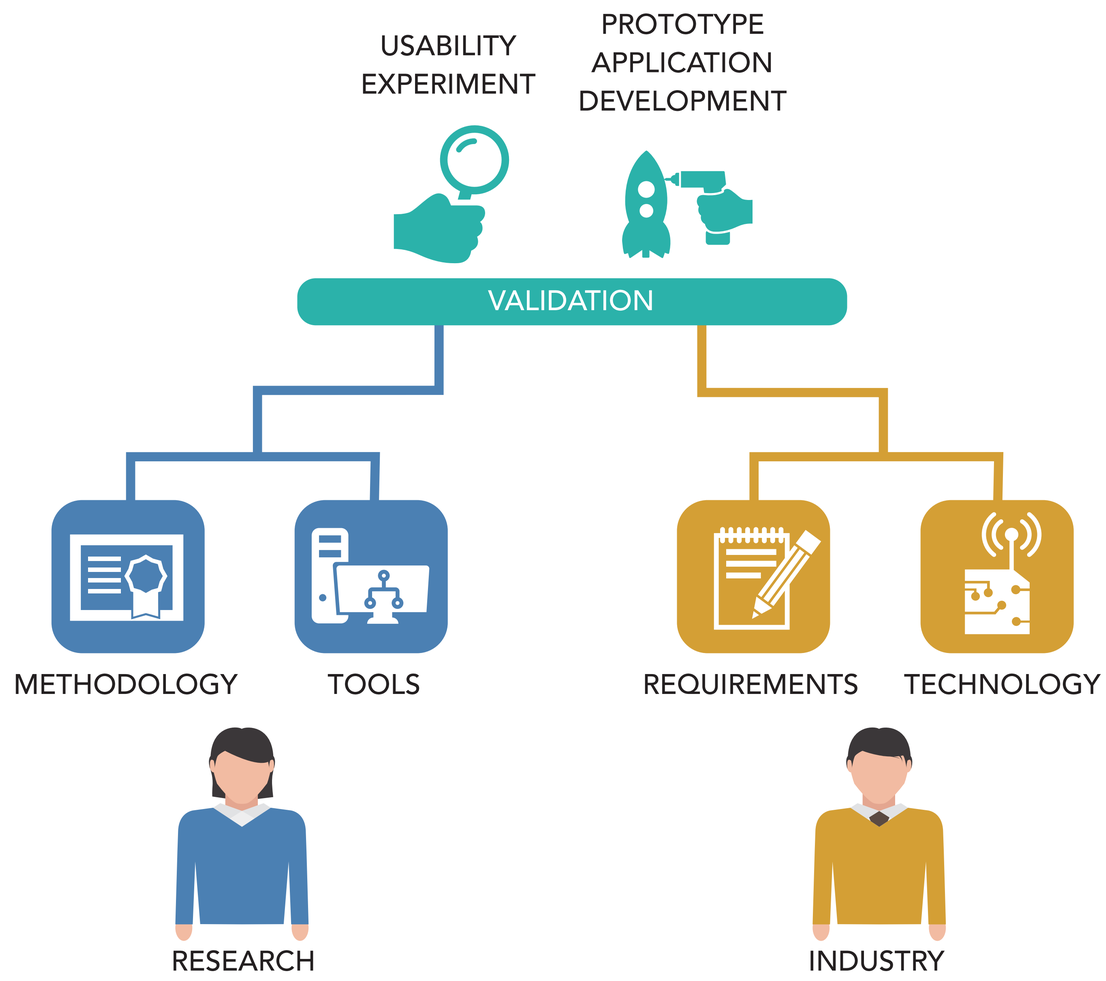
Evaluate the learning cost and usability of the DiaSuite tool-based approach dedicated to developing sensor/actuator applications.

Context

- The Objects World project aims at building a sustainable ecosystem of Internet-of-Things stakeholders based upon the Sigfox radio network [3].

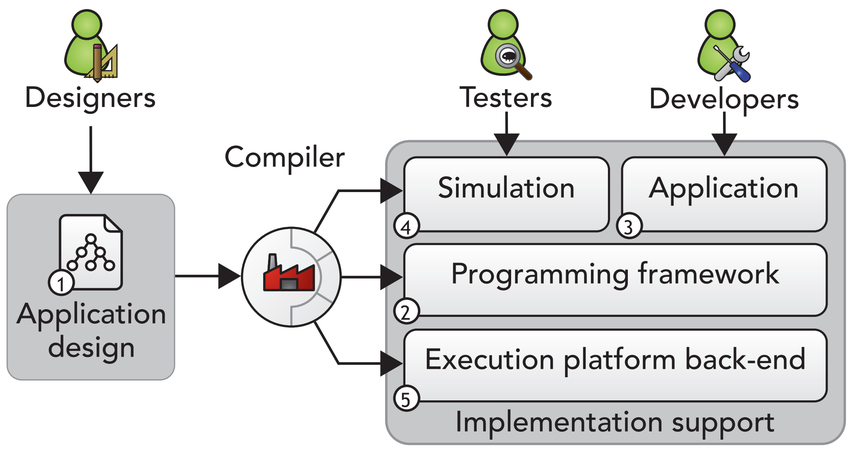


Technology Validation



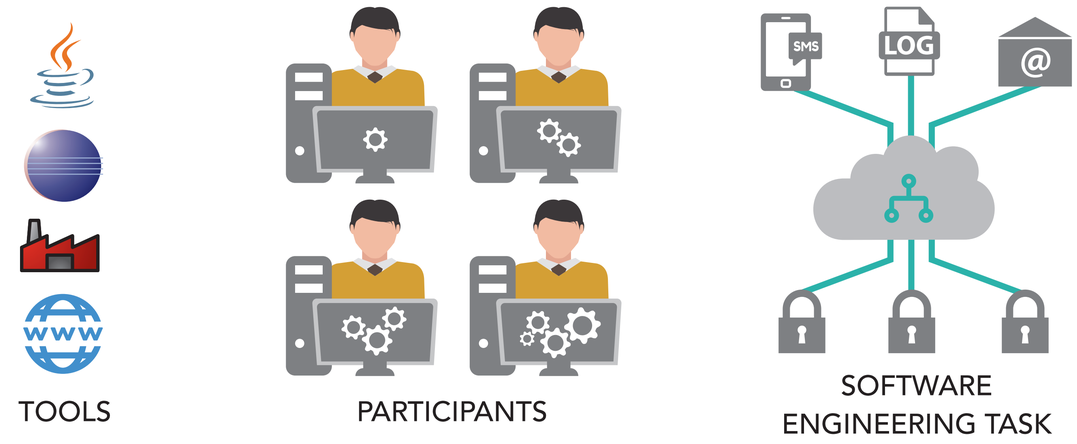
DiaSuite Tool-Based Methodology

- Revolves around the Sense/Compute/Control (SCC) architectural pattern

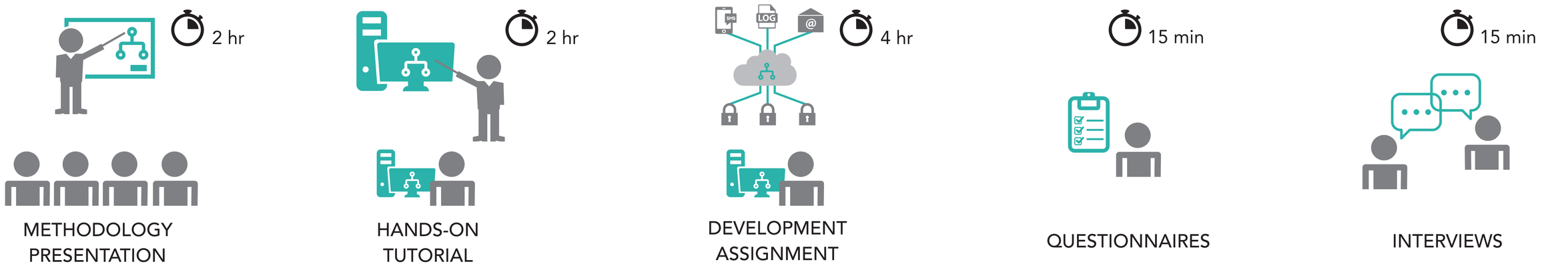


Experimental Setup

- The experiment involved four professional software developers with background in development of IoT applications



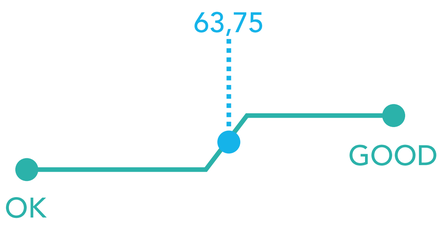
Experimental Evaluation



Experimental Results

Developer	Java exp. (years)	Eclipse exp. (years)	Design (min)	Dev. Feat1 (min)	Dev. Feat2 (min)	Dev. Feat3 (min)	Code size (LOC)	Man. Part (%)
Dev0	0	0	N/A	N/A	N/A	N/A	N/A	N/A
Dev1	1	1	30	92	30	-	1671	10,4
Dev2	3	3	30*	55	15	5	2141	10,7
Dev3	7	7	27	87	18	9	1724	10,3
Expert	3	3	15	32	14	6	1760	10,2

DEVELOPMENT TASK



SYSTEM USABILITY SCALE
QUESTIONNAIRE

Conclusion

- Preliminary evidence that DiaSuite can be transferred to the IoT domain
- Need for further experiments on a statistically larger population
- DiaSuite is a candidate for continuous improvement
- Simple contexts help with the implementation, but may complicate testing

References

[1] B. Bertran, J. Bruneau, D. Cassou, N. Loriant, E. Balland, C. Consel. DiaSuite: a Tool Suite To Develop Sense/Compute/Control Applications. Science of Computer Programming, 2012.

[2] Phoenix team. Objects World project. Online, accessed 10/5/2015, http://phoenix.inria.fr/research-projects/objects-world.

[3] Sigfox Network Operator. Online, accessed 14/8/2015, http://sigfox.com/en/#!/connected-world/sigfox-network-operator.